Claims

1. An orbital machining apparatus for producing a hole in a workpiece by means of a cutting tool, said apparatus comprising:

a first actuator (12) configured for rotating the cutting tool (14) about its longitudinal center axis (16) during the machining of the hole;

a second actuator (21) configured for moving the cutting tool (14) in an axial feed direction substantially parallel to said tool axis (16), said second actuator (21) being simultaneously operable with said first actuator (12);

a third actuator (20) configured for rotating the cutting tool (14) about a principal axis, said principal axis being substantially parallel to said center axis (16) of the tool (14) and coaxial with a longitudinal center axis of the hole to be machined, said third actuator (20) being simultaneously operable with said first and second actuators (12, 21); and

a radial offset mechanism (18) configured for controlling the radial distance of the center axis (16) of the cutting tool (14) from said principal axis, said radial offset mechanism (18) comprising:

an inner cylindrical body (24) having an eccentric cylindrical hole (26), said eccentric hole having a longitudinal center axis that is parallel to and radially offset from a longitudinal center axis of said inner body, said eccentric hole (26) being configured to radially and rotatably support a spindle unit (12) for operating said cutting tool (14); and

an outer cylindrical body (36) having an eccentric cylindrical hole (34), said eccentric hole of said outer body (36) having a longitudinal center axis that is parallel to and radially offset from a longitudinal center axis of said outer body (36), said inner cylindrical body (24) being radially supported in said eccentric hole (34) of the outer cylindrical body (36) and rotatable therein so as to allow for adjustment of the radial distance of said center axis (16) of the cutting tool (14) from said principal axis,

said third actuator (20) including a first motor (44) drivingly connected to the outer cylindrical body (36) for individually rotating the latter about the longitudinal

center axis thereof, and a second motor (50) drivingly connected to the inner cylindrical body (24) for individually rotating the latter about the longitudinal center axis thereof, said first and second motors (44, 50) being configured to rotate the outer and inner cylindrical bodies (36, 24) in synchronism to maintain a mutual rotary position thereof so as to keep the radial offset position of the cutting tool (14) unchanged during a working operation, and the first and second motors (44, 50) being further configured to rotate the cylindrical bodies (36, 24) relative to each other so as to vary the radial offset position of the cutting tool (14),

said third actuator (20) further including a first rotating drive element (48) coaxial to the outer cylindrical body (36) and driven by the first motor (44), and a second rotating drive element (57) coaxial to the outer cylindrical body (36) and rotated by the second motor (50), **characterized** in that the second drive element (57) is rotatably connected to a carrier ring (60) by means of two diametrically opposed, radial drive pins (62) such that the carrier ring (60) may perform a radial sliding movement along the longitudinal axis of the drive pins (62) relative to the second drive element (57) while being rotated thereby, the carrier ring (60) being connected to the inner cylindrical body (24) by means of two diametrically opposed, radial carrier guide shafts (64), which are circumferentially spaced 90° from the drive pins (62), such that the inner cylindrical body (24) may perform a radial sliding movement relative to the carrier ring (60) while being rotated thereby.

2. The apparatus of claim 1, wherein said second drive element (57) is coaxially connected to a belt wheel (54) rotated by the second motor (50) via an endless belt (52).

3. The apparatus of claim 1 or 2, wherein the second drive element (57) constitutes a yoke having two diametrically opposed, axially extending lugs (58) guidingly supporting the carrier ring (60) by means of said drive pins (62).